

RECENT ADVANCES IN THE FIELD OF ECOLOGY ON *CULICOIDES* (DIPTERA: CERATOPOGONIDAE)

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Balenghien I., Garros C.

1. Cirad, UMR CMAEE, Montpellier, France
2. Inra, UMR1309 CMAEE, Montpellier, France

The emergence of bluetongue in Europe in the 2000s led to a considerable increase in scientific publications dedicated to *Culicoides* in the last 10 years. As an example, the annual mean number of papers referenced in PubMed with '*Culicoides*' in the title has risen from 18.2 in 1980 to 2006 versus 36.6 after 2006. This increase was due to a wide variety of studies carried out in Europe during the last decade on *Culicoides* ecology in relation to virus transmission, surveillance or vector control. Methodological constraints or limitations are common in *Culicoides* studies. These include restricted sampling areas, limited numbers of available study sites, taxonomic problems in identification to group or genus level and the fact that these insects are among the smallest haematophagous flies known. This has led to difficulties in interpreting results and has often left anecdotal data as the only available source of information. Bringing together this literature, however, gives valuable information of some aspects of *Culicoides* ecology for probable vector species of bluetongue or Schmallenberg viruses. The

description of larval habitats has allowed assessing on what extent environmental management can control *Culicoides* populations. Host preferences have also been investigated in France by direct (host-baited trap collections) or indirect (blood-meal analysis) methods leading to identify specialist versus generalist feeders with direct consequences in terms of pathogen transmission. In parallel, analysis or modeling of the huge amount of data collected by surveillance networks from the whole Europe increases our understanding of environmental factors driving distribution, dispersion and dynamics of *Culicoides* populations. The extensive work done to assess the efficiency of surveillance traps and their efficacy *versus* animal baited traps to evaluate biting rates is crucial to better estimate the risk of transmission. In this talk we will review the recent publications summarizing the available knowledge on *Culicoides* ecology, and identify the gap of knowledge and eventually the next fronts of research in this field.

Keywords: *Culicoides*, Ecology, Host/vector contact, Larval habitat, Population dynamics, Recent advances, Review